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ABSTRACT

The paper addresses the assessment and management of hyperkinesis in children. Recent research is reported to show that hyperkinetic children differ in psychological functioning, which might account for varying reactions to stimulant medication. An evaluation procedure which identifies the subgroups of hyperkinetic children using behavioral and physiological measures is discussed. (Author/SBH)

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HYPERKINESIS: THE NEED FOR BOTH A PHYSIOLOGICAL AND BEHAVIOURAL ASSESSMENT

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RUNNING HEAD: HYPERKINESIS

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Abstract

This paper addresses itself to the assessment and management of hyperkinesis in children. Whereas the usual assessment is made from behavioural characteristics, recent research has shown that hyperkinetic children differ in physiological functioning, which might account for varying reactions to stimulant medication. There is a need to clearly identify the subgroups of hyperkinetic children using behavioural and physiological measures. Such a procedure will provide pertinent information regarding the treatment and management of the hyperkinetic child. This paper discusses such an evaluation.

HYPERKINESIS: THE NEED FOR BOTH A PHYSIOLOGICAL AND BEHAVIOURAL ASSESSMENT

The primary objectives of the treatment and management of hyperkinetic children should be educational, but the initial concern of people (such as parents, teachers and pediatricians) who are involved with hyperkinetic children, is the control of excessive motor activity displayed in these children. Over the last twenty years, stimulant medication has been the preferred choice of treatment, particularly in North America, even though stimulant medication is not appropriate for all hyperkinetic children (Simmons, 1975). It is to this problem that this paper addresses itself.

O'Malley and Eisenberg (1973), reviewing the literature on hyperkinetic behaviour, conclude that the term hyperkinesis described a heterogeneous group of children with different etiologies, for hyperkinesis represents "a final common pathway for the expression of diverse pathologies." A positive response to stimulant medication by hyperkinetic children, has been interpreted as indicating an organic problem in which hyperkinetic children have abnormal levels of physiological arousal (Wender, 1976; Satterfield, 1975). Wender (1976) suggests that a high level of physiological arousal exists, while Satterfield (1975) subscribes to the existence of low physiological levels of arousal. Satterfield (1975) bases his viewpoint in part, on the inverse relationship found between the behavioural ratings of hyperkinetic children by the teachers, and physiological measures in the laboratory.

This author has also found similar results to those of Satterfield (1975), details of which have been reported elsewhere (Williams, 1976; Williams and Das, Note 1). However, a brief discussion of the investigation is in order.

The investigation addressed itself to several interrelated questions the most important being (1) do children with learning disabilities differ in

behavioural and physiological arousal levels? and (2) what relationship exists between physiological and behavioural arousal. Two measures of arousal were used: (1) a behavioural measure which was a six item child rating scale developed by Davids (1971), the items being hyperactivity, short attention span, variability, impulsivity, irritability and explosiveness and (2) a physiological measure, the Galvanic Skin Response, GSR, which indicates the level of resistance of the skin to a mild electric current. Five aspects of the GSR were measured, namely basal level, latency 1 - evocation time of GSR to occur, latency 2 - duration of response, magnitude and recovery limb.

One hundred and nineteen boys in classrooms for the learning disabled were judged by their teachers on a rating scale for hyperkinesis. The ratings were then factor analyzed and one factor emerged. This factor was called hyperkinesis. From each subject's rating scale, a factor score of hyperkinesis was produced. A normal distribution was then drawn up with subjects being divided into three groups - hyper, normo and hypokinetic. From this distribution, 20 subjects from each group were given a test in the laboratory to determine their physiological arousal level indicated by the Galvanic Skin Response - GSR. A factor analysis of the GSR results, produced one factor which was called physiological arousal. Factor scores were also produced on this measure for each child and a further distribution drawn up, being divided into three levels of physiological arousal, namely - physiologically overaroused, physiologically underaroused and physiologically aroused.

An examination of the relationship between the two measures was carried out on 51 children who had complete records. First, a product moment correlation of the pairs of factor scores was -0.373, $p<0.01$. This correlation suggests that a hyperkinetic child in the classroom is in fact physiologically underaroused. If this negative correlation shows an inverse relationship, then

the hyperkinetic children and the physiologically over-aroused should be distinctly apart on both the GSR and Child Rating Scale. This indeed was found to be true in both cases using multivariate analysis of variance.

Other research workers have shown this inverse relationship, notably Satterfield and his colleagues (Satterfield, 1975). Several important implications concerning the diagnosis and management can be drawn from this relationship.

Diagnostic Implications

Hyperkinesis does not reflect the state of physiological arousal. It is important, therefore, that in diagnosing children suspected as being hyperkinetic, behavioural and physiological measures should be used, since both measures have direct relevance to management techniques which will be discussed later.

The behavioural component of the diagnosis should include all the six forms of behaviour associated with hyperkinesis. In the past, confusion has occurred between the terms "hyperkinesis" and "hyperactivity." Strictly speaking, hyperactivity involves abnormally high levels of involuntary motor activity; but the present study has shown that hyperactivity is related to short attention span, irritability, impulsiveness, explosiveness and variability. The recommendation that all six behaviours (and not only one) be considered together is in accordance with the WHO Seminars on Classification in Child Psychiatry (Rutter, Lebovici, Eisenberg, Sneznevskij, Sadoun, Brooke & Lin, 1969).

The physiological measure was a composite of five GSR components. Research has shown that the GSR is an indicator of arousal. While more research is needed to compare several other autonomic measures with the GSR before one can say that it is the best measure of arousal, the results from the study

are encouraging. This encouragement stems from the fact that learning disabled children could be categorized according to their GSR patterns. Other research workers (Satterfield & Dawson, 1971; Satterfield, Cantwell, Saul, Lesser, & Podosin, 1973) have used only some aspects of the GSR along with EEG and other autonomic measures to show that physiological arousal can be measured and that notable differences do occur between individuals. The suggestion that behavioural and physiological measures should be included when diagnosing hyperkinesis is, in part, an echo of the procedure suggested by Clements and Peters (1962) some sixteen years ago. They had advocated the use of a physiological, neurological and EEG evaluation in order to diagnose children that are hyperkinetic, but who may possibly have different etiologies. For example, a child might be hyperkinetic due to being physiologically under-aroused or the hyperkinesis might be merely situational in origin; and if this is so, then management procedures should be different.

Management Implications

Since the early studies of Bradley (1937) and Bradley and Bowen (1941), the use of drugs has been the primary tool in the management of hyperkinetic behaviour. Of the drugs most commonly used, stimulatns such as Ritalin are most successful, having the effect of decreasing activity level and increasing attention span. However, stimulant medication does not work in all cases (Fish, 1975), and it is to this factor that the present study has relevance. Satterfield (1975) has suggested that stimulants work best in hyperkinetic children that are physiologically underaroused. Das (1973) had suggested the theoretical possibility that behaviourally hyperactive children may indeed be cortically inhibited. If this is the case, then knowledge of the state of physiological arousal should be known before medication is recommended. The stimulant has the effect of raising the physiological arousal level. Thus,

If a child is underaroused, the level of arousal will be raised towards a "normal" level resulting in a decrease in activity and impulsiveness, and increasing attention and concentration. However, the stimulant medication has also been demonstrated to increase the hyperkinetic behavior in children (Simmons, 1975). A reason for this might be that the arousal level in these children was normal or higher before medication, and the behaviour was merely a reaction to the situation. Therefore, the stimulant simply increased the arousal level as it should normally do resulting in the heightening of hyperkinetic behaviour. It has been shown that physiological arousal can be measured and that different levels do exist; but the use of the GSR is still a research tool, and more work is needed in developing it as a standard diagnostic tool.

Drug treatment, however, should not be considered as the only method, and one should look beyond medication because of:

(1) the significant number of children that do not respond to medication (Simmons, 1975);

(2) the lack of knowledge concerning long term effects and, more importantly, the side effects of medication on individuals (Stroufe, 1975); and

(3) the contributing influence of the environment on hyperkinetic behaviour.

It is not surprising, therefore, that behaviour modification techniques have been used with hyperkinetic children. Several studies have reported success (Patterson, 1965; Hall, Lund, & Jackson, 1968; O'Leary & Drabman, 1971), in particular, those studies using token economy in the classroom. Thus, a structured environment along with systematic reinforcement appears helpful in managing distruptive behaviour.

Werry (1968) has pointed out that one treatment may not be sufficient for managing hyperkinetic behaviour due to the fact that the hyperkinetic child is often multiply handicapped. Sprague and Werry (1971) suggest that a combination of drug treatment and behavior modification might be necessary for some children. Indeed, Christensen and Sprague (1973) did investigate the combination of these two treatments with hyperkinetic children. They compared six children receiving behavior modification and Placebo, and six children receiving behaviour modification and Ritalin, with seat activity and daily quizzes as outcome measures. Results showed that seat activity was reduced in both groups by the application of contingent reinforcement, but the subjects who received Ritalin displayed consistently lower rates of movement than the Placebo group. The study by Christensen and Sprague (1973) has provided some evidence that both treatments can be used jointly with some children and has provided a basis for further investigation in this approach.

The need for an interdisciplinary diagnosis of hyperkinesis seems to be called for. The present practice of a diagnosis based on behavioural characteristics alone, leads to the inclusion of a heterogeneous sample at best. A more concise and accurate diagnosis is needed which will evaluate both behavioural and physiological factors. Such an evaluation will provide pertinent information regarding the treatment and management of the hyperkinetic child.

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